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High-Throughput LC-MS/MS method to evaluate the presence of exogenous glycerol in wines

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Glycerol is a natural constituent of wine being produced by yeast during fermentation and its concentration ranges between 5 and 11 g/L depending on yeast strain. It plays an important role on the sweet taste of wine [1]. The addition of synthetic glycerol to wines in order to increase this parameter is not allowed by the European oenological legislation [2]. Actually, the strategy to investigate the presence of exogenous glycerol in wine is based on the detection of impurities produced by the industrial processes on its production [3], which are absent in wines. Synthetic glycerol contains the follows impurities: 3-methoxypropane-1,2-diol (3-MPD) and cyclic diglycerols (CycDs) formed during the purification of the rough industrial product conducted through a distillation process. Gas chromatography mass spectrometry (GC-MS) is the analytical method adopted by the OIV to detect the fraudolent addition of glycerol by measure these two contaminants [4]. To the best of our knowledge, this is the only validated method to detect and quantify 3-MPD and CycDs in wine. However, the application of the GC-MS method shows serious difficulties: sample preparation and time analysis (runtime about 42 min); dirty injections with frequent damage for the coloumn (particularly in the case of sweet wines); mass spectrometer ion source must be cleaned very often to improve the required sensitivity. In order to overcome these limitations a simple LC-MS/MS method has been developed.

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